In The Specification:

Please replace the paragraph found on page 1, from line 5 through line 9, with the following substitute paragraph:

This Application relates to, and claims priority in, U.S. Provisional Patent Application Serial No. 60/417,477, entitled, "Incident And Reflective Light Filter For Digital Cameras And Camcorders," filed on October 9, 2002. The foregoing related application is commonly ~~assigned~~ owned, and is hereby incorporated by reference.

Please insert the following three contiguous new paragraphs so that the first line of these three new paragraphs begins at page 7, line 25, of the Specification:

FIG. 8 is an exploded cross-sectional view of the diffusion filter of FIG. 4, in accordance with one embodiment of the present invention;

FIG. 9 is a block diagram of one embodiment of the electronic camera of FIG. 3, in accordance with the present invention; and

FIG. 10 is a flowchart of method steps for effectively performing a white balance procedure for an electronic camera, in accordance with one embodiment of the present invention.

Please insert the following twelve contiguous new paragraphs so that the first line of these twelve new paragraphs begins at page 21, line 5, of the Specification:

Referring now to FIG. 8, an exploded cross-sectional view of a diffusion filter 810 is shown, in accordance with one embodiment of the present invention. The FIG. 8 diffusion filter 810 corresponds to the diffusion filter disclosed in foregoing FIGS. 1 and 4 which is discussed above from page 18, line 12 through page 19, line 5, of the Specification. In the FIG. 8 embodiment, diffusion filter 810 includes, but is not limited to, a diffusion plate 31, a color compensator 38, and a translucent filter 39. In alternate embodiments, diffusion filter 810 may include elements and functionalities in addition to, or instead of, certain of the elements and functionalities discussed in conjunction with the FIG. 8 embodiment.

In the FIG. 8 embodiment, input light 814 is initially received by a substantially-flat first face of diffusion plate 31. As discussed above, input light 814 may be collected by diffusion filter 810 from an angle of up to 180 degrees in front of the foregoing first face of diffusion plate 31. As shown above in FIGS. 1 and 4, diffusion plate 31 also includes a prism array of prism-like projections that are arranged on a second face of diffusion plate 31. In the FIG. 8 embodiment, each component of input light 814 is separately refracted, dispersed, and diffused by prismatic elements of the prism array to create uniform diffused light 818 that accurately represents an averaged summation of all the different sources of input light 814 in the correct respective proportions.

In the FIG. 8 embodiment, color compensator 38 may include any appropriate color filtration device(s) for altering one or more color components of diffused light 818 to produce corresponding filtered light 822 that has desired color balance characteristics. For example, color compensator 38 may be selected to allow diffusion filter 810 to be implemented as a completely color-neutral device that passes light without any color alterations. Alternately, color compensator 38 may be selected to intentionally add a desired colorcast to light that is passed through diffusion filter 810.

In the FIG. 8 embodiment, translucent filter 39 attenuate filtered light 822 to produce output light 826. In certain embodiments, translucent filter 39 may be selected to ensure that output light 826 is approximately 18% of input light 814. Translucent filter 39 also operates to further diffuse filtered light 822 to produce output light 826 as a uniform neutral averaged-summation of all the different sources of input light 814. The utilization of diffusion filter 810 is further discussed below in conjunction with FIGS. 9 and 10.

Referring now to FIG. 9, a block diagram for one embodiment of an electronic camera 910 is shown, in accordance with the present invention. The FIG. 9 electronic camera 910 corresponds to the electronic camera disclosed in foregoing FIG. 3 which is discussed above on page 12, lines 12-31, of the Specification. In the FIG. 9 embodiment, electronic camera 910 includes, but is not limited to, a diffusion filter 810, a lens 918, an image sensor 922, a storage device 930, and white balance/exposure controls 938. In alternate embodiments, electronic camera 910 may include elements and functionalities in addition to, or instead of, certain of the elements and functionalities discussed in conjunction with the FIG. 9 embodiment.

In the FIG. 9 embodiment, a system user may utilize diffusion filter 810 to capture a reference image 926 for effectively performing various white balance procedures. In practice, image sensor 922 captures input light 814 (FIG. 8) along an optical path 914 through diffusion filter 810 and lens 918. As discussed above in conjunction with FIG. 8, reference image 926 therefore represents a uniform neutral averaged-summation of all the different sources of input light 814.

As discussed above on page 15, lines 5-10 of the Specification, electronic camera 910 may then analyze the color characteristics of reference image 926 to identify color correction values necessary to achieve accurate white balance in electronic camera 910 under the current lighting conditions. Electronic camera 910 may provide the foregoing color correction values to white balance/exposure controls 938 for effectively capturing white-balanced images under the current lighting conditions. The system user may then remove diffusion filter 810, and may proceed to capture and store captured images 942 into storage device 930.

Electronic camera 910 may also utilize reference image 926 for accurately setting exposure values for captured images 942 since diffusion filter 810 operates to ensure that light reaching image sensor 922 is approximately 18% of light entering diffusion filter 810. In certain alternate embodiments, electronic camera 910 may capture and store captured images 942 without calculating the foregoing color correction values and performing a corresponding white balance procedure. In such situations, a system user or other appropriate entity may utilize appropriate image processing software on a separate computer device to analyze reference image 926, calculate appropriate color correction values, and corresponding perform white balance procedures upon captured images 942 in a post-production environment. One embodiment for effectively utilizing diffusion filter 810 and electronic camera 910 is further discussed below in conjunction with FIG. 10.

FIG. 10 is a flowchart of method steps for effectively performing a white balance procedure for an electronic camera 910, in accordance with one embodiment of the present invention. The FIG. 10 flowchart discloses a white balance procedure that is also discussed above on page 13, lines 1-15, and page 15, lines 5-10, of the Specification. The FIG. 10 flowchart is presented for purposes of illustration, and in alternate embodiments, the present invention may utilize steps and sequences in addition to, or instead of, certain of the steps and sequences discussed in conjunction with the FIG. 10 embodiment.

In the FIG. 10 embodiment, in step 1012, a system user or other appropriate entity initially attaches diffusion filter 810 in line with an optical path 914 to an image sensor 922 of an electronic camera 910. Then in step 1016, the image sensor 922 captures a reference image 926 through diffusion filter 810, and stores the reference image 926 into an appropriate storage device 930. As discussed above, the reference image 926 provides a uniform neutral averaged-summation of all the different sources of light received by diffusion filter 810. In the FIG. 10 embodiment, reference image 926 may be captured from reflective light with the image sensor 922 pointed at a particular photographic subject, or may alternately be captured from incident light with image sensor 922 pointed at one or more light sources for a particular photographic subject.

In step 1020, after reference image 926 has been captured and stored into storage device 930, the system user may remove diffusion filter 810 from electronic camera 910. In step 1024, the system user may instruct electronic camera 910 to enter a custom white-balance mode by utilizing any effective techniques. Then, in step 1028, electronic camera 910 selects the captured reference image 926 as a custom white-balance reference. Next, in step 1032, electronic camera 910 may analyze color characteristics of reference image 926, and may calculate corresponding white-balance color correction values.

In step 1036, electronic camera 910 performs a white balance procedure by utilizing the foregoing white-balance correction values. Then, in step 1040, the system user may utilize electronic camera 910 in a white-balanced condition for capturing and storing one or more captured image(s) 942. In step 1044, the system user or other entity may determine whether a lighting change has occurred with respect to particular selected photographic subject matter. If a lighting change has occurred, then the FIG. 10 process may return to step 1012 for capturing a new reference image 926, and performing a new corresponding white balance operation. For at least the foregoing reasons, the present invention therefore provides an improved system and method for effectively performing white balance procedures for electronic cameras.